

Country: UK

Technology: Domestic Cold Appliances

Sub Category: Freezers and Refrigerator/
Freezers Combinations

Introduction

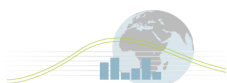
The first stage in the Mapping and Benchmarking process is the definition of the products, i.e. clearly setting the boundaries that define the products for use in data collection and analysis. Doing this ensures that comparison between the participating countries is done against a specific and consistent set of products.

The summary definition for this product is:

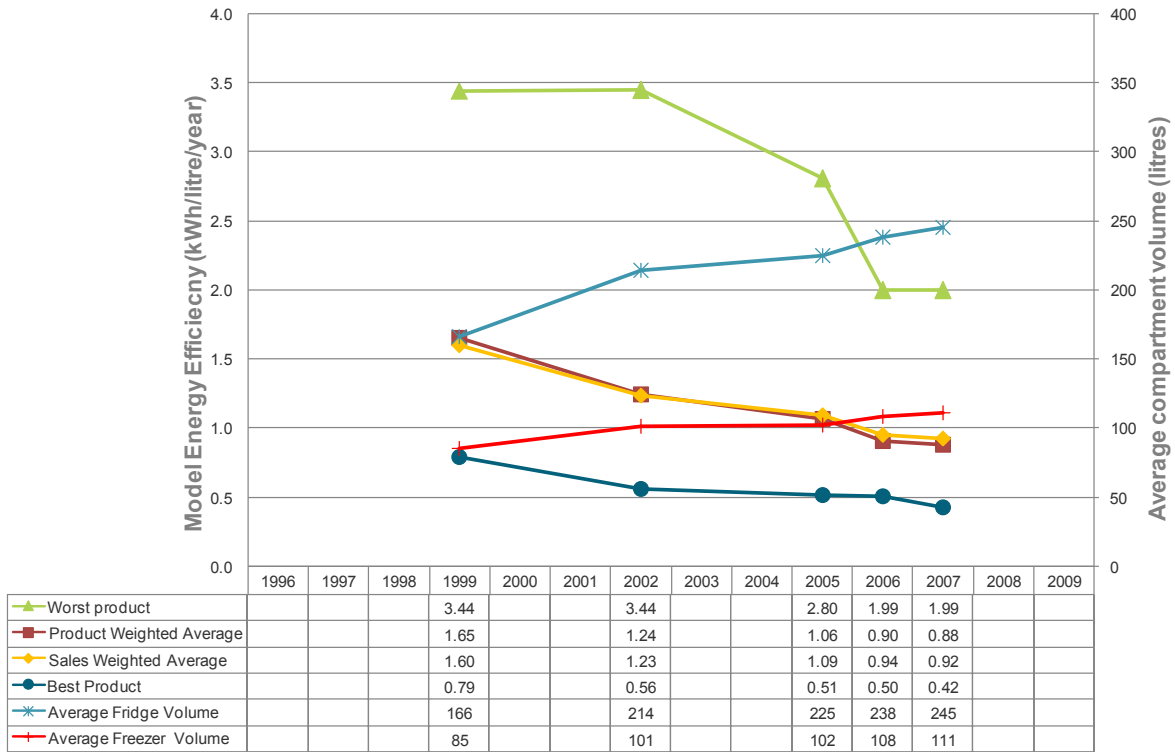
<p>Under Counter/ upright Refrigerators</p> <p>(Single Grouping – collect data only)</p>	<p>Refrigerator with freezer (ice) compartment</p> <p>(Single grouping – collect data only)</p>	<p>Side-by-Side and Freezer top/ Refrigerator bottom and Refrigerator top/ Freezer bottom</p> <p>(Collect data on proportion of each type of unit in the market)</p>	<p>Chest/Under Counter/Upright Freezer</p> <p>(Collect data on proportion of each type of unit in the market)</p>
<p>Where units are:</p> <ul style="list-style-type: none"> • From all climate classes (but collect data on specific climate class that may be useful for later analysis) • Have freezer compartments with rated temperatures between -12 to \geq-15C (all temperature ratings to refrigerator with freezer (ice) compartment) • Differentiated (if possible) between units with peripheral water coolers and ice makers 			
<p>Do not differentiate between</p> <ul style="list-style-type: none"> • Defrost Cycles including Manual/Cyclical/Automatic (although collect data in case normalisation is required) • Controls mechanisms including manual, automatic and cyclical • Built in and stand-alone units (but where differentiated in market, collect data to enable normalisation) • Volume (but collect data on gross volumes as base metric) • Climate class (but collect data on climate class in case future analysis required, plus data on related local test conditions for climate classes) 			

The detailed product definitions can be found at the Annex website:

<http://mappingandbenchmarking.iea-4e.org/>



Energy Efficiency of New Fridge-Freezers UK

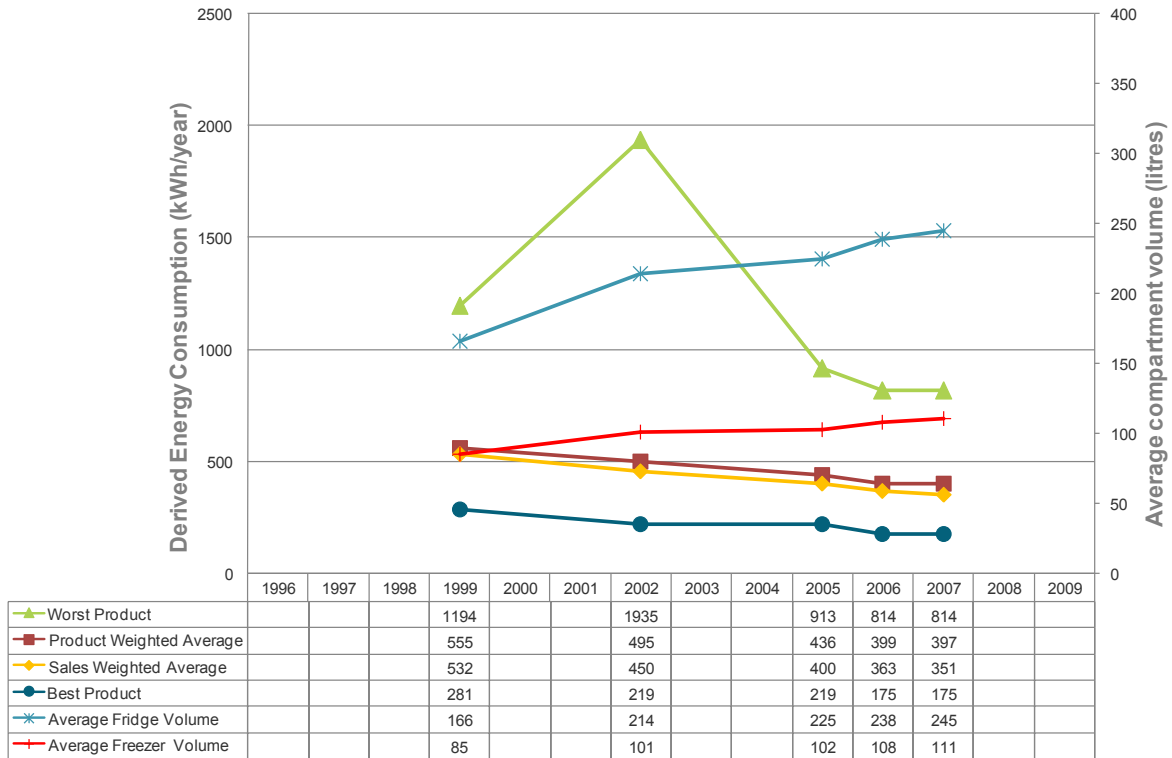


Key notes on Graph (see notes section 1)

- Some data points are calculated using only a partial data set as some products have been excluded due to incomplete model data (e.g. volumes of compartments)
- Energy consumption and efficiency figures are based on performance under local test conditions and adjusted to account for two main differences in product technology/functionality:
 - variations in relative fridge/freezer volume (based on conversion factor used in the EU)
 - Whether the product has an ice making device

Figures are further adjusted to take into account variations in the external test temperature between countries. Model compartment volumes are unadjusted and based on local regulations.

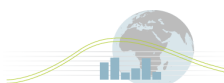
Energy Consumption of New Fridge-Freezers UK



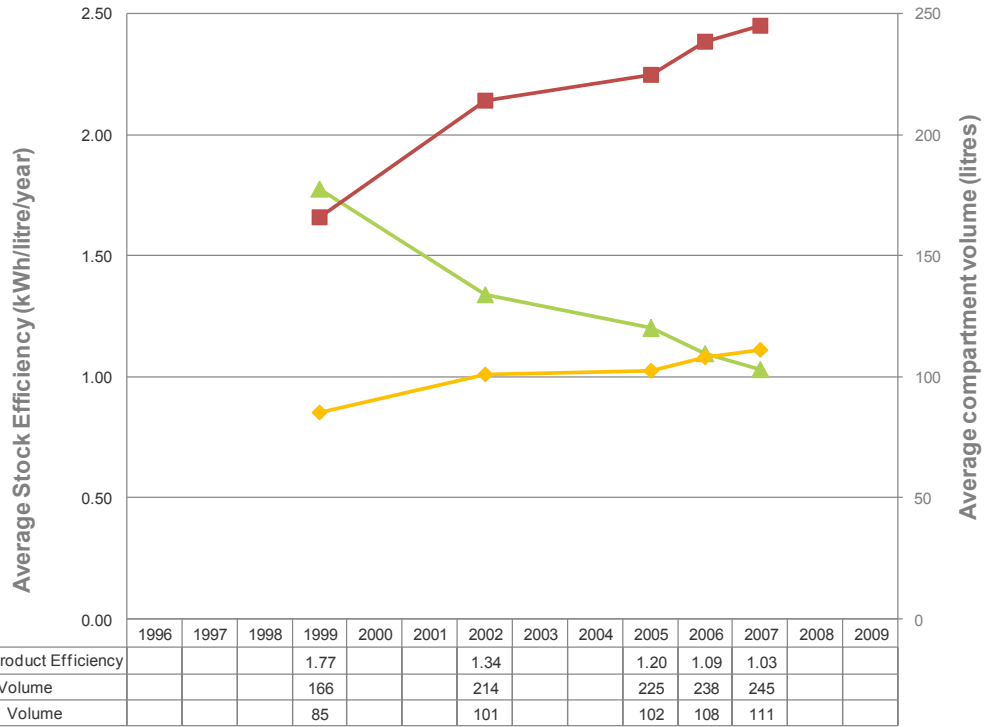
Key notes on Graph (See notes section 2)

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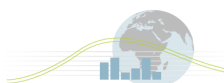


Energy Efficiency in the Installed Fridge-Freezer Stock UK

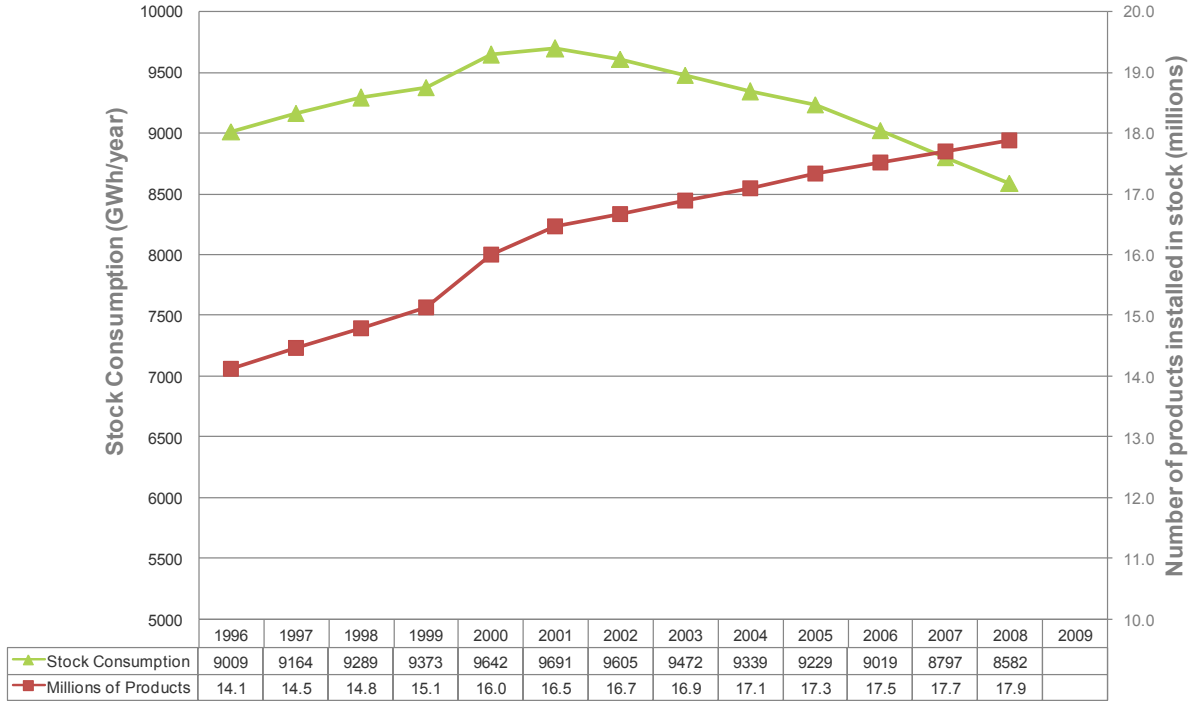


Key notes on Graph (See Notes Section 3)

- Graph is based on modelling data rather than direct market survey or sales data.
- Average volumes are based on sales data for that year rather than average volume in the stock. Given the upward trend in compartment volumes, **these figures will estimate the Stock Average product Efficiency is better than reality.**



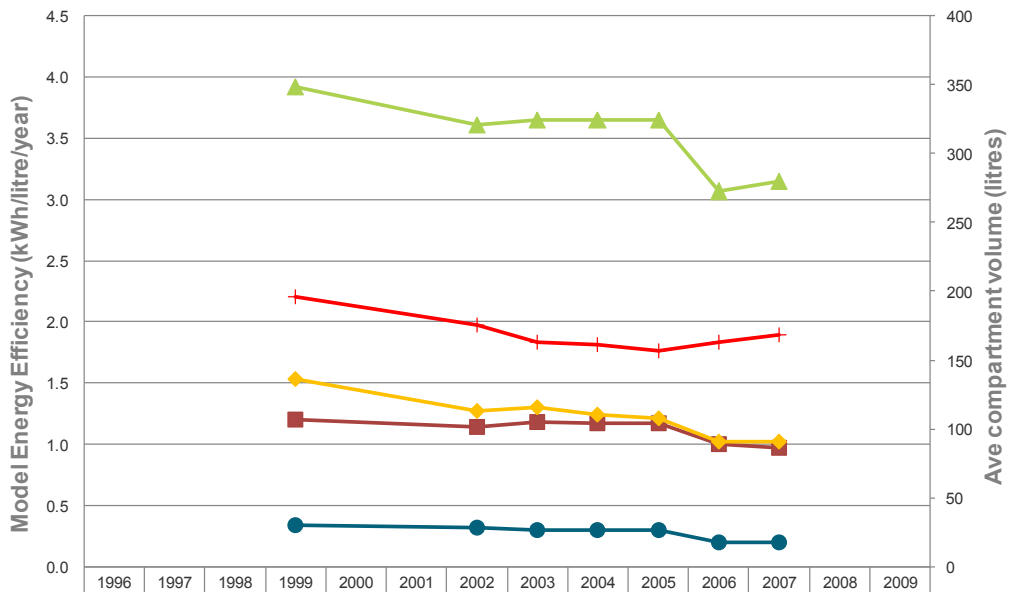
Energy Consumption in the Installed Refrigerator Stock UK



Key notes on Graph (see Notes Section 4)

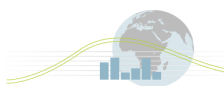
- Graph is based on modelling data rather than direct market survey or sales data.
- Note graph axes do not start at zero.

Energy Efficiency of New Freezers UK

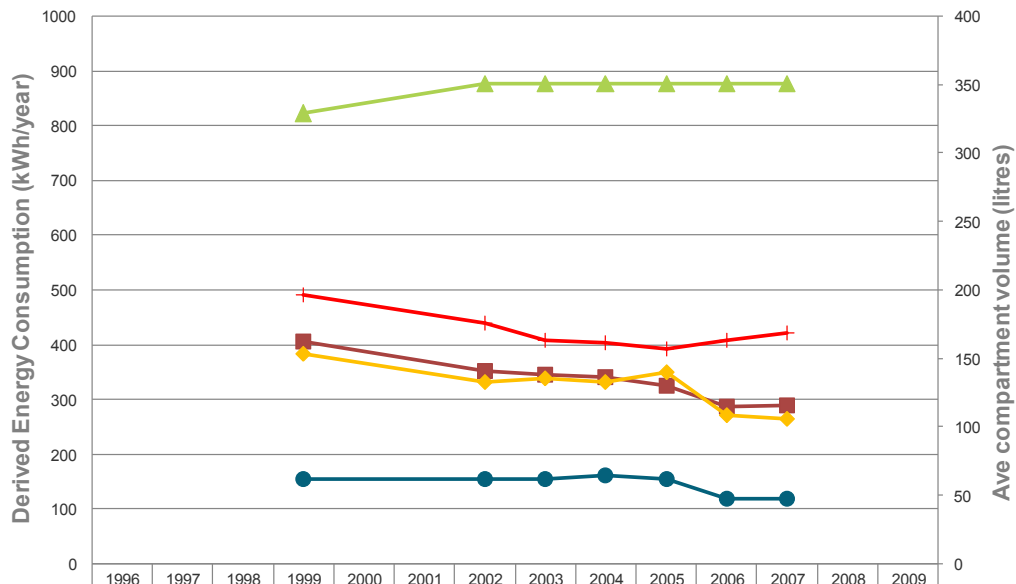


Key notes on Graph (see notes section 1)

- Some data points are calculated using only a partial data set as some products have been excluded due to incomplete model data (e.g. volumes of compartments)
- Energy consumption and efficiency figures are based on performance under local test conditions and are adjusted to a “standardised” refrigerator equivalence volume (based on conversion factor used in the EU). Data is further adjusted to take into account variations in the external test temperature between countries. Model compartment volumes are unadjusted and based on local regulations.



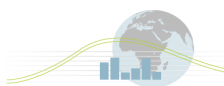
Energy Consumption of New Freezers UK



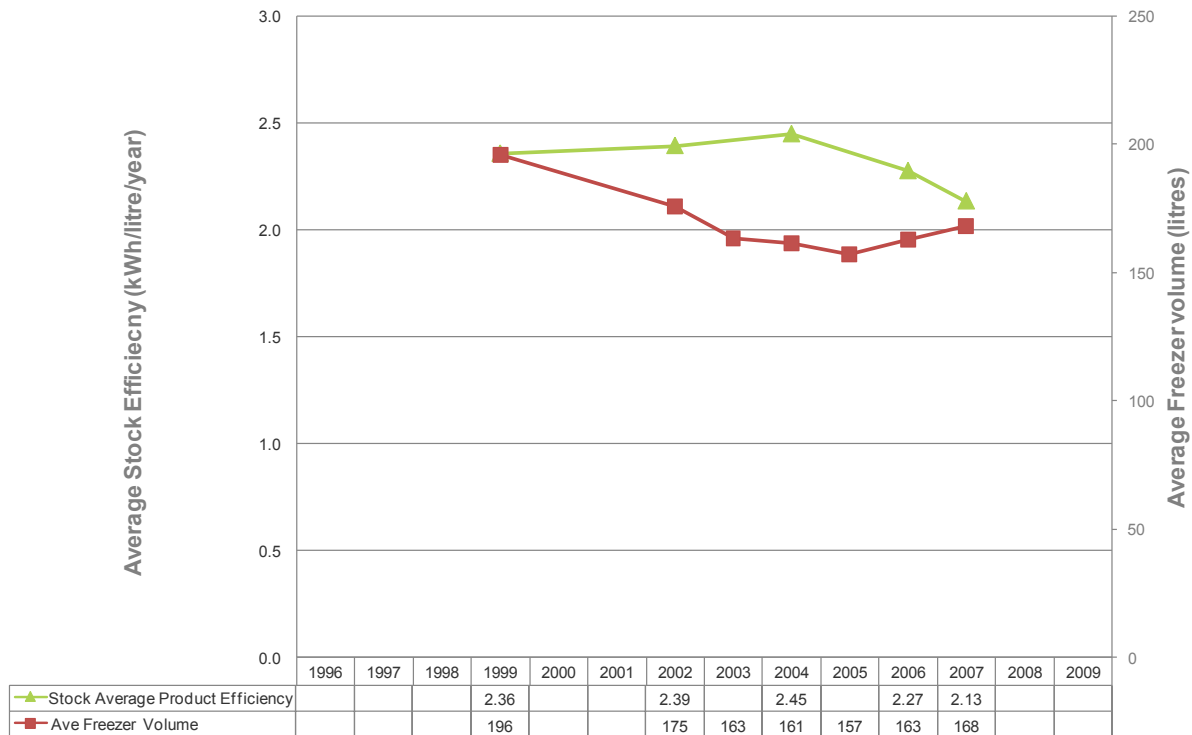
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Worst Product				822			877	876.00	877	876.00	876	876		
Product Weighted Average				405			351	344.86	340	323.67	286	288		
Sales Weighted Average				382			331	338.73	331	349.22	271	265		
Best Product				153			153	153.30	161	153.30	118	118		
Ave Freezer Volume				196			175	163	161	157	163	168		

Key notes on Graph (See notes section 2)

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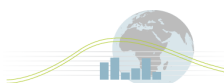


Energy Efficiency in the Installed Freezer Stock UK

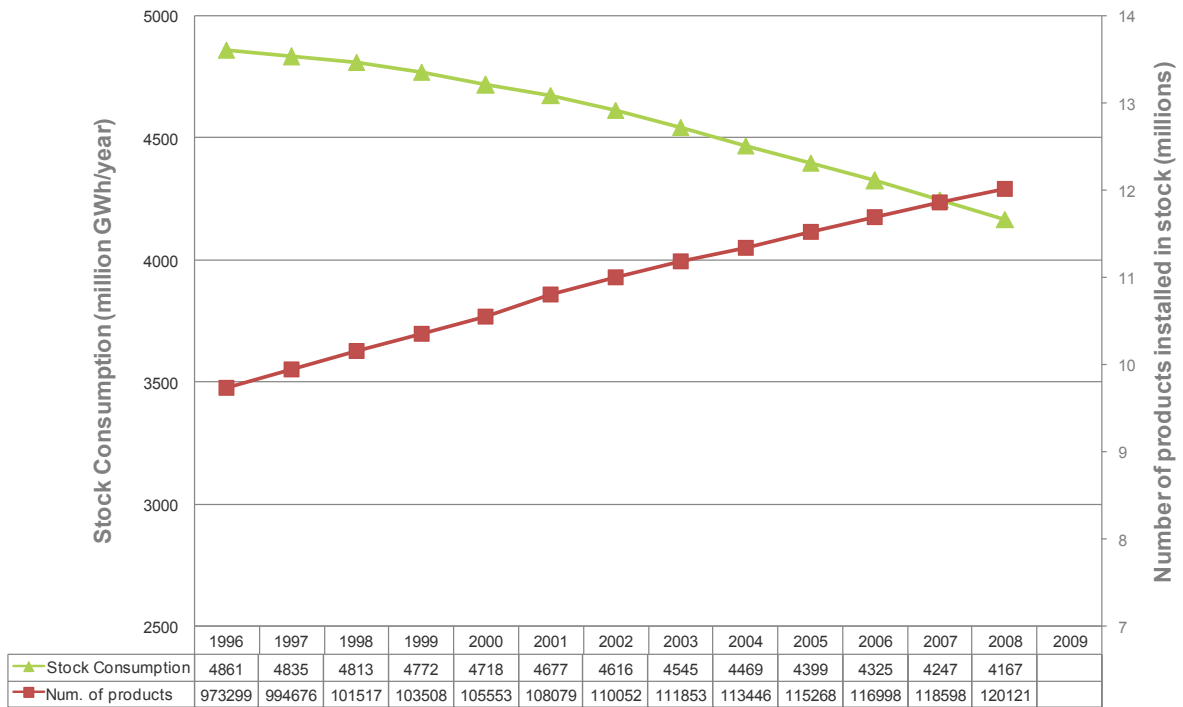


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Energy Consumption of the Installed Freezer Stock UK



Key notes on Graph (see Notes Section 4)

- Graph is based on modelling data rather than direct market survey or sales data.
- Graph axes do not start at zero.

Major Policy Interventions (See notes Section 5)

Local regulations:

Policy name	Period in force	Description	Impact <i>Relative impact of policy</i>
EC Energy Label ¹	1995 – 2010	Defines A to G efficiency classes	All cold appliances to be labelled – improvement in the average efficiency over time
EC MEPS (EuP) ²	1999 – (July) 2010	Limit sales to A, B, C class, plus D & E for chest freezers	All cold appliances - improvement in the average efficiency over time
EC Energy Label ³	2004-2010	Defines A+ and A++ classes	All cold appliances - improvement in the average efficiency over time
Energy Saving Recommended ⁴	2001 - ongoing	Point of sale promotion to identify most efficient models (criteria uses EC energy label classes - from July 2004: A+)	It is not possible to distinguish the effects of this policy individually from the whole mix of policies
Industry Commitment ⁵	2002 - 2010	CECED commitment: only B or better (except chest freezers) on market by end 2004	Improvement in the average efficiency over time

Other relevant interventions in the market

Some additional policies are expected to contribute to the delivery of energy savings in the sector in the reference and policy scenarios.

- [Carbon Emissions Reduction Target \(CERT\)](#) - The Carbon Emissions Reduction Target (CERT) (2008 – 2011) is the third three-year phase of the energy supplier obligation. Under CERT, energy suppliers must, by 2011, deliver measures that will

¹ www.legislation.hms.gov.uk/si/si1994/Uksi_19943076_en_1.htm.

² www.opsi.gov.uk/si/si1997/19971941.htm

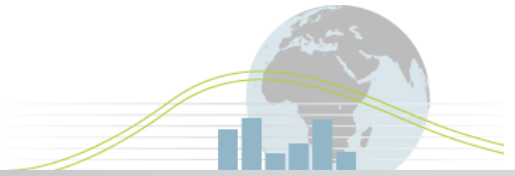
³ www.opsi.gov.uk/si/si2007/ukxi_20072037_en_1

⁴ Run by the Energy Saving Trust <http://www.est.org.uk/>.

⁵ "Voluntary commitment of reducing energy consumption of household refrigerators, freezers and their combinations (2002-2010)" 31st October 2002.

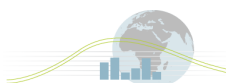
<http://www.cecce.eu/ICECED/easnet.dII/ExecReq/Redirection?eas:oldfilename=/community/files/296/phpXLy1ow/UICCOLD2002.pdf>





provide overall lifetime carbon dioxide savings of 154 MtCO₂. It is expected to lead to energy supplier investment of some £2.8bn in household energy efficiency measures.

- Government's [Act on CO₂](#) campaign which aims to help people save money, save energy and reduce their CO₂ emissions. The campaign highlights how individuals can act to make a difference. ACT ON CO₂ is a cross-government initiative, currently involving the Department of Energy and Climate Change (DECC), the Department for Transport (DfT) and the Department for Communities and Local Government (DCLG).
- [Code for Sustainable Homes](#) - measures the sustainability of a new home against categories of sustainable design, rating the 'whole home' as a complete package. The Code uses a 1 to 6 star rating system to communicate the overall sustainability performance of a new home. The Code sets minimum standards for energy and water use at each level and, within England, replaces the EcoHomes scheme, developed by the Building Research Establishment (BRE).



Cultural Issues (See Notes Section 6)

Data suggests:

- Gradual shift in consumer preferences over time from refrigerators to refrigerator/freezer combination units
- Volume of refrigerator/freezer combination units has grown significantly over time. This seems to imply a gradual move from “standard EU appliance footprint” units to larger footprint side by side and top/bottom combination units.
- Average Fridge-Freezer volumes (the most popular products) are increasing.
- There is a greater propensity in the UK towards following US trends than in the rest of Europe. This includes an increase in side-by-side fridges.
- Most Fridge-Freezers now have freezers at the bottom instead of the top and freezers are of relatively larger capacity. Accordingly, they tend to use an increasing amount of overall energy.

Notes on data

Section 1: Notes on Product Efficiency

1.1 Test methodologies, Performance Standards and Labelling Requirements

Energy consumption is claimed according to the requirements of the EC energy label and the appropriate energy efficiency class allocated according to the calculations given in the energy label directives.

The test standard for EC energy labelling is EN 153 which calls upon the EN ISO 15502.

Test Standard name	Date in force	Description	Comments
EN 153:2005 Methods of measuring the energy consumption of electric mains operated household refrigerators, frozen food storage cabinets, food freezers and their combinations, together with associated characteristics.	2005	Energy, temperature and volume of all types of domestic cold appliances are measured in accordance with test standard (BS) EN 153 and used for energy label declarations. EN 153 refers to EN ISO 15502:2005	Supersedes EN 153:1995 (withdrawn 30 June 2008). Although there is some debate as to which test standard is currently valid under UK law.
EN ISO 15502: 2005 Household refrigerating appliances, refrigerator freezers – characteristics and test methods.	2005	Defines characteristics and test methods	Prior to this standard there were four test standards for each of the main refrigerating appliance types

Specific information:

External/ambient test temperature	25 ± 0.5°C (Deviations from 25°C within ± 0.5°C are corrected in accordance with EN 153:2006 Clause 15.2.1.)
Internal temperatures for the appliances	
Fridge compartment	Mean temp of +5°C (no tolerance because in general, the energy consumption at this temp is obtained by interpolation.)
Freezer compartment (3 or 4 star compartment)	-18°C or colder

1.2 Product Efficiency Graphic

Source: GFK sales database 1999, 2002, 2004, 2006, 2007. Additional information can be found at www.gfkrt.com.

Key calculations undertaken:

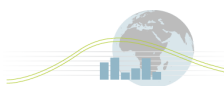
Derived Total Model Volume: based on net volume (as defined in local regulations), multiply freezer by 2.15 (EU standard) to get equivalent fridge volume. Add this volume to the net fridge volume to establish the net total volume normalised to refrigerator. This volume is the Derived Total Volume

Derived Model Energy Consumption: based on total annual energy consumption under test conditions, multiply by factor to correct for external test temperature during test (3% addition in energy consumption for each degree C below 25 and 3% reduction for each degree C above 25). Reduce consumption by 5% if the unit has an ice maker. This energy consumption is the Derived Unit Energy Consumption

Derived Model Energy Efficiency: Equals Derived Model Energy Consumption divided by Derived Total Model Volume

Sales Weighted Energy Efficiency of New Models: (Sum of (Derived Model Energy Efficiency multiplied by sales volume of Model in year) for all Models) divided by (Sum of sales volume of all Models in year)

Model Weighted Energy Efficiency of New Models (used where no sales data is available): (Sum of Derived Model Energy Efficiency for all models sold in year) divided by (Number of Models sold in year).



Ave Product Volume: is the product weighted average volume of products sold in each year.

Some of the data in the database was not used due to the omission of information necessary to undertake the analysis. The proportion of the total data sets used were as follows:

Fridge-Freezers:

Coverage	1999	2002	2006	2007
Sales units analysed	801,539	928,513	1,294,494	1,360,251
Sales units removed	10,302	269,470	0	0
% of market analysed	99%	78%	100%	100%
Products analysed	508	637	1,083	1,160
Products removed	18	409	0	0
% of market analysed	97%	61%	100%	100%

Freezers:

Coverage	1999	2002	2004	2006	2007
Sales units analysed	470,616	631,724	153,454	861,251	728,287
Sales units removed	8,658	197,801	861,421	26,579	100,037
% of market analysed	98%	76%	15%	97%	88%
Products analysed	908	465	255	722	618
Products removed	39	184	406	49	174
% of market analysed	96%	72%	39%	94%	78%

Section 2: Notes on Product Consumption

2.1 Test methodologies, Performance Standards and Labelling Requirements

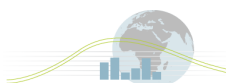
Refer to section 1.1

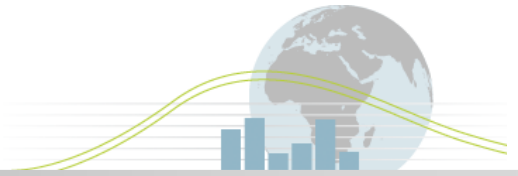
2.2 Product Consumption Graphic

Refer to section 1.2

Section 3: Notes on Efficiency of Stock

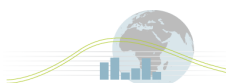
The information is drawn from MTP's model which is based on stock projections (not actual data). The model is a stock-based model, which calculates sales using the stock projection and the product lifetime. Real sales data is input into evidence sheets as a check only, to help evaluate the robustness of the output sales calculated from the model. This data series is usually incomplete. (The sales shown in the product graphs are based on the full stock-generated (rather than input) sales data series.) Sales data from market research





(GfK) is reviewed alongside the model calculation in order to confirm that the trend in the model is appropriate, but actual reported (GfK) sales data are not input into the model.

The model calculates the number of units entering the stock. These units are required to replace models removed from stock as old units fail. The units are also needed to meet the increase in sales of units caused by the increase in household numbers and the increase in the percentage of households owning dishwashers.



Section 4: Notes on Consumption of Stock

The information is drawn from MTP's model which is based on stock projections (not actual data). See Section: 3 note.

Section 5: Notes on Policy Interventions

Commission Directive 2003/66/EC

Program Type: Mandatory Label

Year Published: 03/07/2003

Economy: EU Member Countries

Year Effective: 2004

Implementing Agency: National bodies of EU member Countries

Description:

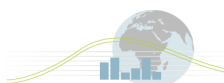
The European Commission has now formally adopted a new directive (2003/66/EC) which extends the existing A-G energy labelling scale for domestic refrigeration appliances through the introduction of 2 new high efficiency classes (A+ and A++) from 1 July 2004.

The European Commission has issued a Commission Directive 94/2/EC of 21 January 1994 implementing Council Directive 92/75/EEC, with regard to energy labeling of household electric refrigerators, freezers and their combinations.

The framework directive provides a legal structure for the energy labeling of domestic appliances, requiring manufacturers and retailers to attach a label, including the energy performance, to the appliance when displayed for sale. The implementing directives describe what the indication should be for a specific appliance, given an energy consumption measured following a specified European test standard. These directives require EU member states to transpose the legal text into national law and have no legally binding meaning for citizens or companies.

Although a central directive is issued through the European Commission, each country needs to establish national legislation for the program to be enforced. Member States are responsible for all aspects of implementation including compliance, label accuracy, educational and promotional activities. Product suppliers need to provide proof of appliance efficiency and are also responsible for the supply of labels and brochures in appropriate languages.

This Directive shall apply to electric mains operated household refrigerators, frozen food storage cabinets, food freezers and their combinations. Appliances that may also use other energy sources, such as batteries, are excluded.



This directive is the amendment of the framework directive 94/2/EC implementing Council Directive 92/75/EEC for mandatory labeling scheme, which was agreed in 1992 and cancelled the framework directive 79/530/EEC.

The Commission Directive 2003/66/EC directive will enter into force on 1 July 2004.

Directive 96/57/EC Refrigerators, Freezers and Combinations

Program Type: Minimum Energy Performance Standard - Mandatory

Product: Refrigerator-freezers

Economy: EU Member Countries

Year Published: 03/09/1996

Year Effective: 03/09/1999

Implementing Agency: European Commission (EC) -
http://ec.europa.eu/enterprise/eco_design/index_en.htm

Voluntary Commitment on Reducing Energy Consumption of Household Refrigerators, Freezers and their Combinations

Program Type: Minimum Energy Performance Standard - Voluntary

Product: Refrigerator-freezers

Economy: EU Member Countries

Description: The European Commission has pursued voluntary agreement with the European Federation of Domestic Appliance Manufacturers (CECED) to improve the energy efficiency of household refrigerating appliances.

Year Published: 31/10/2002

Year Effective: Applicable from 2002-2010

Implementing Agency: European Federation of Domestic Appliance Manufacturers -
<http://www.eced.org/>

